

Table 6.2 below is an extrapolation from previous ETI results<sup>138</sup> and identifies an upper bound estimate of *national* universal service funding requirements using the BCM, with ETI's corrections, and assessing support requirements at the wire center level.<sup>139</sup> ETI's April report provides additional discussion and examples of this issue.<sup>140</sup>

| Table 6.2<br>Comparative Summary Results of the BCM and the ETI Partially Corrected BCM<br>(Wire Center Aggregation)<br>National Total (excluding Alaska) |                  |                         |
|---|------------------|-------------------------|
|   | BCM              | ETI Partial Corrections |
| Annual Benchmark Cost   | \$18,402,608,162 | \$4,784,678,122         |
| Average Monthly Cost  | \$16.71          | \$12.37                 |
| USF Requirement (\$20)  | \$3,977,572,193  | \$1,034,168,770         |
| USF Requirement (\$30)  | \$2,203,441,910  | \$462,722,801           |
| USF Requirement (\$40)  | \$1,372,205,121  | \$233,274,871           |
| Note: Adjustment factors based upon a comparison of BCM and ETI results for Washington are used to estimate national ETI results.                         |                  |                         |

Table 6.3 provides additional results of our analysis of the CBG vs. wire center issue. It demonstrates that US West's fear that low-cost CBGs will receive "unnecessary" funding support when grouped with high-cost CBGs is misplaced. Rather, to the extent that this occurs, the effect is eclipsed by the opposite phenomenon, namely that a number of otherwise "high-cost" CBGs, when properly analyzed at the wire center level, do not in fact qualify for high cost support at all.

138. See the June 19, 1996 letter for more information.

139. A table with results of similar magnitude is included in the ETI reply report, *The BCM Debate, A Further Discussion*, May 1996 at 21. The difference between Table 2.3 which appears on page 21 of ETI's Reply Report and the new Table 1 is simply that Table 2.3 does not include the adjustment for the penetration rate.

140. *The Cost of Universal Service, A Critical Assessment of the Benchmark Cost Model*, April 1996, at 97-101.

Table 6.3

Comparison of BCM High Cost Support Requirement  
for Washington State with ETI Partial Corrections  
at the CBG and Wire Center Level

|  | \$20         | \$30         | \$40         |
|--|--------------|--------------|--------------|
| Scenario A: Number of wire centers receiving USF when support is assessed at the CBG level         | 288          | 214          | 160          |
| Scenario B: Number of wire centers receiving USF when support is assessed at the wire center level | 154          | 85           | 57           |
| Support level under Scenario A   | \$29,230,056 | \$17,429,545 | \$11,430,572 |
| Support level under Scenario B   | \$19,966,076 | \$10,755,951 | \$6,402,815  |
| Excess USF support requirement under CBG-based funding   | \$9,263,980  | \$6,673,594  | \$5,027,757  |

Note: The BCM recognizes a total of 345 wire centers in Washington State

The preceding discussion focusses on those specific instances where a CBG-based cost proxy would lead to USF support being granted while a wire center-based assessment of need would indicate that no USF support is required. Returning to the specific hypothetical numerical example offered by US West — the La Junta, Colorado wire center operated by Eagle Telecommunications Co.<sup>141</sup> — we can demonstrate that US West's hypothetical costs and price thresholds can be just as easily used to show the opposite effect, i.e., that no support would be required when CBG costs are aggregated at the wire center level. The example assumed a rural community with 1000 lines of which 800 are in the village at an average cost of \$20 per month, and 200 are on outlying farms at an average cost of \$200

141. La Junta was formerly served by US West but was divested by the Company in 1994 as part of its program to sell off small, rural exchanges that would qualify for high-cost support if removed from the aggregate US West statewide study areas.

per month.<sup>142</sup> Under a wire center based approach the average cost per line would be \$56 and, assuming a \$30 price threshold, each line would be eligible for \$26 of USF, so the total USF support for the 1000 lines in the wire center would be \$26,000 per month. According to US West, new entrants would receive "\$6 more than cost" for serving customers in town. US West's concern is simply that new entrants would receive unnecessary support for serving customers in town and there would be no incentive to serve the customers on the farm, because there would be a \$144 support shortfall.

Under a CBG-based approach, using this same example, support of \$170 per line would be provided for the 200 lines in the country and no support would be provided for the CBG in the village. Thus, the total USF support for the same wire center area would be \$34,000 per month (i.e., 200 lines times \$170 per line). But if a small modification is made to the numerical relationships assumed by US West — e.g., 900 lines in the village and 100 lines in the country — then the total cost (for the entire wire center) would be \$38,000 and there would be only \$8,000 of support required at the \$30 support level. Under a CBG-based assessment, USF support of \$17,000 would be awarded to the wire center area.

US West's objection to assessing the need for high cost support at the wire center level as opposed to the CBG level is presumably related to the idea that because incumbent LECs are required to set "average" rates over the entire exchange, new competitors in the market for residential local exchange service will "cherry-pick" the CBGs in a high cost wire center that are comparatively less costly to serve than more outlying CBGs. That is, carriers will gladly accept the per-line high cost funding support that has been assigned to the entire wire center but choose to serve only a "lower cost" subset of the wire center.<sup>143</sup> As it turns out, however, ILECs do not always charge an "average" or uniform price throughout an exchange. In the case of La Junta, for example, only customers located in the village (the "base rate area") pay the "base rate" of \$14.80 per month for single-party residential service. Customers located "on the farm" pay "zone" rate increments based upon their relative distance from the wire center building, which can amount to as much as \$20.00 per month in addition to the \$14.80 base rate.

In fact, the tariff structure extant in La Junta is not atypical of rural exchanges served by Bell as well as independent LECs. The notion that new entrants will ignore rural areas because rural customers pay "average" rates is belied by the fact that many, if not most, rural customers do not in any sense pay "average" rates at all. Indeed, new entrants, who are likely to experiment with alternative technologies for serving rural areas, may be attracted by the prevailing high rural ILEC rates and enter those markets with technological solutions that could significantly benefit the high-cost area that the ILECs demand be

---

142. Chart IV of US West's hand-out of June 5, 1996.

143. In US West's example, the approach would yield a bonanza of \$8000 per month for the La Junta area.

“protected.” Such “protection” in the form of unwarranted universal service support will be more likely to deter competition and innovation than to benefit these customers in the long run.

### **CBG disaggregation limited to High Cost Wire Centers**

While we continue to believe and recommend that funding be based upon proxy costs developed at the wire center level, regulators could also consider an alternate approach that would foreclose spurious funding in fundamentally low-cost areas while still providing support for rural and insular high-cost communities. This could be accomplished by a two-step approach:

- (1) Calculate proxy costs on a wire center basis for all wire centers nationwide. If the proxy cost for a given wire center does not exceed the adopted support threshold level, the entire wire center is excluded from receiving high-cost support, even if one or more individual CBGs within the wire center are above the threshold.
- (2) For all wire centers whose costs (calculated at the wire center level) are above the support threshold, calculate the proxy costs for each of the CBGs within such wire centers. CBGs whose proxy costs exceed the support threshold would then qualify for high-cost funding, those below the threshold would not.

We have attempted to quantify the effects of this refinement upon our previous support estimates, using the BCM.<sup>144</sup> Of the total 345 wire centers in Washington, only 154 exhibit wire center proxy costs in excess of the \$20 support threshold. The USF requirement for these wire centers under the “combined wire center/CBG approach” would be \$23.4-million. The corresponding support requirement at the \$30 and \$40 support thresholds would be \$12.2- and \$7.5-million, respectively. Table 6.4 extrapolates the results of this analysis to the national level.

---

144. The locked nature of the BCM2 prevents this type of analysis.

*Economies of Scale and Scope*

| Table 6.4   |                 |               |               |
|---|-----------------|---------------|---------------|
| National USF Requirement when Support is Limited to<br>High Cost CBGs in High Cost Wire Centers<br>(Excluding Alaska) |                 |               |               |
| Support Threshold   | \$20            | \$30          | \$40          |
| National USF  | \$1,194,409,566 | \$531,357,725 | \$274,305,751 |

As is discussed in Chapter 2 above, the design of the BCM2 does not readily support an evaluation of the impact of this correction.

## **Appendix 6A** | **DERIVATION OF OBJECTIVE FILL FACTORS FOR OUTSIDE PLANT**

*Appendix 6A: Derivation of Objective Fill Factors for Outside Plant*

| Derivation of Objective Fill Factors for Outside Plant                                  |                                 |  |                                 |                    |                                     |               |
|---|---------------------------------|--|---------------------------------|--------------------|-------------------------------------|---------------|
| Feeder  |                                 |  |                                 |                    |                                     |               |
|   | Objective Fill Factors          |  |                                 | Number of Lines    |                                     |               |
| Zone  | Residential Single<br>(assumed) | Business and Additional Residential<br>(derived) | Total Network<br>(BCM2 Default) | Residential Single | Business and Additional Residential | Total Network |
| <= 5  | .95                             | .50  | .75                             | 555,672            | 237,012                             | 792,684       |
| 5 to 200  | .95                             | .62  | .80                             | 23,974,807         | 13,431,760                          | 37,406,567    |
| 200 to 650  | .95                             | .68  | .80                             | 12,129,492         | 10,955,634                          | 23,085,126    |
| 650 to 850  | .95                             | .76  | .85                             | 4,201,798          | 3,776,028                           | 7,977,826     |
| 850 to 2550   | .95                             | .75  | .85                             | 27,128,806         | 22,615,096                          | 49,743,902    |
| >2550   | .95                             | .76  | .85                             | 23,999,380         | 21,680,812                          | 45,680,192    |
| Distribution  |                                 |  |                                 |                    |                                     |               |
|   | Objective Fill Factors          |  |                                 | Number of Lines    |                                     |               |
| Zone  | Residential Single<br>(assumed) | Business and Additional Residential<br>(derived) | Total Network<br>(BCM2 default) | Residential Single | Business and Additional Residential | Total Network |
| <= 5  | .40                             | .40  | .40                             | 555,672            | 237,012                             | 792,684       |
| 5 to 200  | .45                             | .45  | .45                             | 23,974,807         | 13,431,760                          | 37,406,567    |
| 200 to 650  | .95                             | .38  | .55                             | 12,129,492         | 10,955,634                          | 23,085,126    |
| 650 to 850  | .95                             | .48  | .65                             | 4,201,798          | 3,776,028                           | 7,977,826     |
| 850 to 2550   | .95                             | .60  | .75                             | 27,128,806         | 22,615,096                          | 49,743,902    |
| >2550   | .95                             | .68  | .80                             | 23,999,380         | 21,680,812                          | 45,680,192    |
| Source of Number of Lines: July 3 letter from BCM2 sponsors to FCC, summary result page |                                 |  |                                 |                    |                                     |               |

## **Appendix 6B** | **RUNS RELATIVE TO ECONOMICS OF SCALE**



## Appendix 6B: Runs Relative to Economics of Scale

**State: Washington**

**Date: 8/5/92**

**Time: 4:43:31 PM**

**Assumptions:**

Network A

Residence Lines Multiplier = 1.00

Business Lines = 0

Cable Fill Factors set to BCM2 Defaults

| Aggregate Support           | ARMIS          |
|-----------------------------|----------------|
| At \$20 =                   | \$ 457,241,913 |
| At \$30 =                   | \$ 257,373,919 |
| At \$40 =                   | \$ 112,519,549 |
| At \$50 =                   | \$ 40,191,723  |
| At \$60 =                   | \$ 12,585,014  |
| At \$70 =                   | \$ 15,447,199  |
| At \$80 =                   | \$ 33,973,958  |
| Annual Benchmark Cost =     | \$ 887,156,635 |
| State Average Monthly Cost= | \$ 39.42       |

| Density      | Households | Lines     |
|--------------|------------|-----------|
| Less 5       | 19,407     | 19,407    |
| 5 to 200     | 416,680    | 416,680   |
| 200 to 650   | 273,228    | 273,228   |
| 650 to 850   | 109,294    | 109,294   |
| 850 to 2550  | 691,803    | 691,803   |
| Greater 2550 | 365,096    | 365,096   |
| Total        | 1,875,508  | 1,875,508 |

| Cost Category    | ARMIS<br>Households |
|------------------|---------------------|
| \$0<=\$5         | -                   |
| \$5<=\$10        | -                   |
| \$10<=\$15       | -                   |
| \$15<=\$20       | 13,806              |
| \$20<=\$25       | 161,501             |
| \$25<=\$30       | 375,849             |
| \$30<=\$35       | 461,393             |
| \$35<=\$40       | 389,151             |
| \$40<=\$45       | 133,314             |
| \$45<=\$50       | 60,333              |
| \$50<=\$55       | 53,094              |
| \$55<=\$60       | 43,804              |
| \$60<=\$65       | 39,989              |
| \$65<=\$70       | 33,039              |
| \$70<=\$75       | 13,314              |
| \$75<=\$100      | 49,541              |
| \$100<=\$150     | 36,460              |
| \$150<=\$200     | 6,891               |
| \$200<=\$250     | 4,006               |
| \$250<=\$300     | -                   |
| \$300<=\$500     | 23                  |
| \$500<=\$1000    | -                   |
| \$1000+          | -                   |
| Total Households | 1,875,508           |

| Loop Category    | Households |
|------------------|------------|
| 0 <= 5Kft        | 194,576    |
| 5Kft <= 10Kft    | 473,673    |
| 10Kft <= 15Kft   | 432,323    |
| 15Kft <= 20Kft   | 283,523    |
| 20Kft <= 25Kft   | 171,102    |
| 25Kft <= 30Kft   | 106,537    |
| 30Kft <= 40Kft   | 102,024    |
| 40Kft <= 50Kft   | 51,096     |
| 50Kft <= 60Kft   | 21,986     |
| 60Kft <= 70Kft   | 14,541     |
| 70Kft <= 80Kft   | 10,481     |
| 80Kft <= 90Kft   | 7,398      |
| 90Kft <= 100Kft  | 3,685      |
| 100Kft <= 150Kft | 2,511      |
| 150Kft <= 200Kft | 52         |
| 200Kft+          | -          |

| Loop Information    | Length  |
|---------------------|---------|
| Minimum Loop Length | 756     |
| Maximum Loop Length | 165,901 |
| Average Loop Length | 16,665  |

|                            |           |
|----------------------------|-----------|
| Maximum Monthly Cost       | \$ 457.60 |
| Average Monthly Cost       | \$ 39.42  |
| Lines Above \$10K Loop Inv | 2,424     |

*Appendix 6B: Runs Relative to Economics of Scale*

State: Washington

| Density      | Summary Results                 |  | Weighted  |
|--------------|---------------------------------|--|-----------|
| Less 5       | Sum of # Households             |  | 19,407    |
|              | Sum of # Lines                  |  | 19,407    |
|              | Average of Loop Length          |  | 70,978    |
|              | Average of Loop \$ per Line     |  | \$6,215   |
|              | Average of Total Invstmnt \$/Ln |  | \$6,763   |
|              | Average of Monthly Costl        |  | \$ 141.62 |
|              |                                 |  |           |
| 5 to 200     | Sum of # Households             |  | 416,680   |
|              | Sum of # Lines                  |  | 416,680   |
|              | Average of Loop Length          |  | 30,993    |
|              | Average of Loop \$ per Line     |  | \$2,466   |
|              | Average of Total Invstmnt \$/Ln |  | \$2,666   |
|              | Average of Monthly Costl        |  | \$ 60.89  |
|              |                                 |  |           |
| 200 to 650   | Sum of # Households             |  | 273,228   |
|              | Sum of # Lines                  |  | 273,228   |
|              | Average of Loop Length          |  | 16,189    |
|              | Average of Loop \$ per Line     |  | \$1,203   |
|              | Average of Total Invstmnt \$/Ln |  | \$1,335   |
|              | Average of Monthly Costl        |  | \$ 34.78  |
|              |                                 |  |           |
| 650 to 850   | Sum of # Households             |  | 109,294   |
|              | Sum of # Lines                  |  | 109,294   |
|              | Average of Loop Length          |  | 13,453    |
|              | Average of Loop \$ per Line     |  | \$1,232   |
|              | Average of Total Invstmnt \$/Ln |  | \$1,351   |
|              | Average of Monthly Costl        |  | \$ 35.02  |
|              |                                 |  |           |
| 850 to 2550  | Sum of # Households             |  | 691,803   |
|              | Sum of # Lines                  |  | 691,803   |
|              | Average of Loop Length          |  | 11,550    |
|              | Average of Loop \$ per Line     |  | \$1,051   |
|              | Average of Total Invstmnt \$/Ln |  | \$1,166   |
|              | Average of Monthly Costl        |  | \$ 31.37  |
|              |                                 |  |           |
| Greater 2550 | Sum of # Households             |  | 365,096   |
|              | Sum of # Lines                  |  | 365,096   |
|              | Average of Loop Length          |  | 8,435     |
|              | Average of Loop \$ per Line     |  | \$968     |
|              | Average of Total Invstmnt \$/Ln |  | \$1,076   |
|              | Average of Monthly Costl        |  | \$ 29.52  |
|              |                                 |  |           |

## Appendix 6B: Runs Relative to Economics of Scale

State: Washington

Date: 8/5/92

Time: 4:13:46 PM

### Assumptions

Network B

Residence Lines Multiplier = 0.21

Business Lines included (BCM2 Default)

Cable Fill Factors set to BCM2 Defaults

| Aggregate Support               | ARMIS         |
|---------------------------------|---------------|
| At \$20 = \$                    | 1,091,049.309 |
| At \$30 = \$                    | 882,625.366   |
| At \$40 = \$                    | 700,661.284   |
| At \$50 = \$                    | 549,396.013   |
| At \$60 = \$                    | 427,020.762   |
| At \$70 = \$                    | 334,792.904   |
| At \$80 = \$                    | 268,255.972   |
| Annual Benchmark Cost = \$      | 748,401.217   |
| State Average Monthly Cost = \$ | 43.80         |

| Density      | Households | Lines     |
|--------------|------------|-----------|
| Less 5       | 19,098     | 7,809     |
| 5 to 200     | 408,594    | 227,029   |
| 200 to 650   | 266,499    | 221,816   |
| 650 to 850   | 101,986    | 79,455    |
| 850 to 2550  | 681,340    | 502,273   |
| Greater 2550 | 397,991    | 385,660   |
| Total        | 1,875,508  | 1,424,042 |

| Cost Category    | ARMIS Households |
|------------------|------------------|
| \$0<=\$5         | -                |
| \$5<=\$10        | -                |
| \$10<=\$15       | 6.079            |
| \$15<=\$20       | 50.827           |
| \$20<=\$25       | 76.975           |
| \$25<=\$30       | 103.967          |
| \$30<=\$35       | 117.045          |
| \$35<=\$40       | 136.648          |
| \$40<=\$45       | 128.547          |
| \$45<=\$50       | 106.942          |
| \$50<=\$55       | 131.099          |
| \$55<=\$60       | 126.844          |
| \$60<=\$65       | 122.420          |
| \$65<=\$70       | 117.815          |
| \$70<=\$75       | 94.319           |
| \$75<=\$100      | 301.107          |
| \$100<=\$150     | 128.580          |
| \$150<=\$200     | 45.605           |
| \$200<=\$250     | 74.777           |
| \$250<=\$300     | 5.162            |
| \$300<=\$500     | 644              |
| \$500<=\$1000    | 83               |
| \$1000+          | 23               |
| Total Households | 1,875,508        |

| Loop Category    | Households |
|------------------|------------|
| 0 <= 5Kft        | 194,576    |
| 5Kft <= 10Kft    | 473,673    |
| 10Kft <= 15Kft   | 432,323    |
| 15Kft <= 20Kft   | 283,523    |
| 20Kft <= 25Kft   | 171,102    |
| 25Kft <= 30Kft   | 106,537    |
| 30Kft <= 40Kft   | 102,024    |
| 40Kft <= 50Kft   | 51,096     |
| 50Kft <= 60Kft   | 21,986     |
| 60Kft <= 70Kft   | 14,541     |
| 70Kft <= 80Kft   | 10,481     |
| 80Kft <= 90Kft   | 7,398      |
| 90Kft <= 100Kft  | 3,685      |
| 100Kft <= 150Kft | 2,511      |
| 150Kft <= 200Kft | 52         |
| 200Kft+          | -          |

| Loop Information    | Length  |
|---------------------|---------|
| Minimum Loop Length | 756     |
| Maximum Loop Length | 165,901 |
| Average Loop Length | 13,274  |

|                            |    |          |
|----------------------------|----|----------|
| Maximum Monthly Cost       | \$ | 1,407.75 |
| Average Monthly Cost       | \$ | 43.80    |
| Lines Above \$10K Loop Inv |    | 18,760   |

*Appendix 6B: Runs Relative to Economics of Scale*

State: Washington

| Density      | Summary Results                 | Weighted  |
|--------------|---------------------------------|-----------|
| Less 5       | Sum of # Households             | 19,098    |
|              | Sum of # Lines                  | 7,809     |
|              | Average of Loop Length          | 68.385    |
|              | Average of Loop \$ per Line     | \$8,034   |
|              | Average of Total Invstmnt \$/Ln | \$9,316   |
|              | Average of Monthly Cost l       | \$ 192.83 |
| 5 to 200     | Sum of # Households             | 408,594   |
|              | Sum of # Lines                  | 227,029   |
|              | Average of Loop Length          | 27.386    |
|              | Average of Loop \$ per Line     | \$3,585   |
|              | Average of Total Invstmnt \$/Ln | \$3,884   |
|              | Average of Monthly Cost l       | \$ 84.73  |
| 200 to 650   | Sum of # Households             | 266,499   |
|              | Sum of # Lines                  | 221,816   |
|              | Average of Loop Length          | 14.297    |
|              | Average of Loop \$ per Line     | \$1,321   |
|              | Average of Total Invstmnt \$/Ln | \$1,467   |
|              | Average of Monthly Cost l       | \$ 37.34  |
| 650 to 850   | Sum of # Households             | 101,986   |
|              | Sum of # Lines                  | 79,455    |
|              | Average of Loop Length          | 12.152    |
|              | Average of Loop \$ per Line     | \$1,465   |
|              | Average of Total Invstmnt \$/Ln | \$1,594   |
|              | Average of Monthly Cost l       | \$ 39.74  |
| 850 to 2550  | Sum of # Households             | 681,340   |
|              | Sum of # Lines                  | 502,273   |
|              | Average of Loop Length          | 10.748    |
|              | Average of Loop \$ per Line     | \$1,325   |
|              | Average of Total Invstmnt \$/Ln | \$1,448   |
|              | Average of Monthly Cost l       | \$ 36.85  |
| Greater 2550 | Sum of # Households             | 397,991   |
|              | Sum of # Lines                  | 385,660   |
|              | Average of Loop Length          | 6,785     |
|              | Average of Loop \$ per Line     | \$1,004   |
|              | Average of Total Invstmnt \$/Ln | \$1,115   |
|              | Average of Monthly Cost l       | \$ 30.27  |

## Appendix 6B: Runs Relative to Economics of Scale

**State: Washington**

**Date: 8/4/92**

**Time: 4:28:14 PM**

### Assumptions

Network A

Residence Lines Multiplier = 1.00

Business Lines = 0

Cable Fill Factors set to .95 for both Feeder and Distribution

with the following exceptions

Distribution Fill Density Zone 1 = 0.4

Distribution Fill Density Zone 2 = 0.45

| Aggregate Support               | ARMIS       |
|---------------------------------|-------------|
| At \$20 = \$                    | 430,582.083 |
| At \$30 = \$                    | 232,689.768 |
| At \$40 = \$                    | 132,038.229 |
| At \$50 = \$                    | 90,188.290  |
| At \$60 = \$                    | 62,586.407  |
| At \$70 = \$                    | 45,447.888  |
| At \$80 = \$                    | 33,974.468  |
| Annual Benchmark Cost = \$      | 80,478.495  |
| State Average Monthly Cost = \$ | 39.12       |

| Density      | Households | Lines     |
|--------------|------------|-----------|
| Less 5       | 19,407     | 19,407    |
| 5 to 200     | 416,680    | 416,680   |
| 200 to 650   | 273,228    | 273,228   |
| 650 to 850   | 109,294    | 109,294   |
| 850 to 2550  | 691,803    | 691,803   |
| Greater 2550 | 365,096    | 365,096   |
| Total        | 1,875,508  | 1,875,508 |

| ARMIS            |            |
|------------------|------------|
| Cost Category    | Households |
| \$0<=\$5         | -          |
| \$5<=\$10        | -          |
| \$10<=\$15       | -          |
| \$15<=\$20       | 14,535     |
| \$20<=\$25       | 178,508    |
| \$25<=\$30       | 396,371    |
| \$30<=\$35       | 471,389    |
| \$35<=\$40       | 352,961    |
| \$40<=\$45       | 122,461    |
| \$45<=\$50       | 59,122     |
| \$50<=\$55       | 53,094     |
| \$55<=\$60       | 43,804     |
| \$60<=\$65       | 39,989     |
| \$65<=\$70       | 33,039     |
| \$70<=\$75       | 13,314     |
| \$75<=\$100      | 49,541     |
| \$100<=\$150     | 36,460     |
| \$150<=\$200     | 6,891      |
| \$200<=\$250     | 4,006      |
| \$250<=\$300     | -          |
| \$300<=\$500     | 23         |
| \$500<=\$1000    | -          |
| \$1000+          | -          |
| Total Households | 1,875,508  |

| Loop Category    | Households |
|------------------|------------|
| 0 <= 5Kft        | 194,576    |
| 5Kft <= 10Kft    | 473,673    |
| 10Kft <= 15Kft   | 432,323    |
| 15Kft <= 20Kft   | 283,523    |
| 20Kft <= 25Kft   | 171,102    |
| 25Kft <= 30Kft   | 106,537    |
| 30Kft <= 40Kft   | 102,024    |
| 40Kft <= 50Kft   | 51,096     |
| 50Kft <= 60Kft   | 21,986     |
| 60Kft <= 70Kft   | 14,541     |
| 70Kft <= 80Kft   | 10,481     |
| 80Kft <= 90Kft   | 7,398      |
| 90Kft <= 100Kft  | 3,685      |
| 100Kft <= 150Kft | 2,511      |
| 150Kft <= 200Kft | 52         |
| 200Kft+          | -          |

| Loop Information    | Length  |
|---------------------|---------|
| Minimum Loop Length | 756     |
| Maximum Loop Length | 165,901 |
| Average Loop Length | 16,665  |

|                            |    |        |
|----------------------------|----|--------|
| Maximum Monthly Cost       | \$ | 457.60 |
| Average Monthly Cost       | \$ | 39.12  |
| Lines Above \$10K Loop Inv |    | 2,424  |

*Appendix 6B: Runs Relative to Economics of Scale*

State: Washington

| Density      | Summary Results                 | Weighted  |
|--------------|---------------------------------|-----------|
| Less 5       | Sum of # Households             | 19,407    |
|              | Sum of # Lines                  | 19,407    |
|              | Average of Loop Length          | 70.978    |
|              | Average of Loop \$ per Line     | \$6,215   |
|              | Average of Total Invstmnt \$/Ln | \$6,763   |
|              | Average of Monthly Costl        | \$ 141.62 |
| 5 to 200     | Sum of # Households             | 416,680   |
|              | Sum of # Lines                  | 416,680   |
|              | Average of Loop Length          | 30.993    |
|              | Average of Loop \$ per Line     | \$2,466   |
|              | Average of Total Invstmnt \$/Ln | \$2,666   |
|              | Average of Monthly Costl        | \$ 60.89  |
| 200 to 650   | Sum of # Households             | 273,228   |
|              | Sum of # Lines                  | 273,228   |
|              | Average of Loop Length          | 16,189    |
|              | Average of Loop \$ per Line     | \$1,153   |
|              | Average of Total Invstmnt \$/Ln | \$1,286   |
|              | Average of Monthly Costl        | \$ 33.83  |
| 650 to 850   | Sum of # Households             | 109,294   |
|              | Sum of # Lines                  | 109,294   |
|              | Average of Loop Length          | 13,453    |
|              | Average of Loop \$ per Line     | \$1,204   |
|              | Average of Total Invstmnt \$/Ln | \$1,323   |
|              | Average of Monthly Costl        | \$ 34.48  |
| 850 to 2550  | Sum of # Households             | 691,803   |
|              | Sum of # Lines                  | 691,803   |
|              | Average of Loop Length          | 11,550    |
|              | Average of Loop \$ per Line     | \$1,038   |
|              | Average of Total Invstmnt \$/Ln | \$1,153   |
|              | Average of Monthly Costl        | \$ 31.12  |
| Greater 2550 | Sum of # Households             | 365,096   |
|              | Sum of # Lines                  | 365,096   |
|              | Average of Loop Length          | 8,435     |
|              | Average of Loop \$ per Line     | \$958     |
|              | Average of Total Invstmnt \$/Ln | \$1,067   |
|              | Average of Monthly Costl        | \$ 29.34  |

## Appendix 6B: Runs Relative to Economics of Scale

**State: Washington**

**Date: 8/4/92**

**Time: 5:14:01 PM**

### Assumptions

Network B

Residence Lines Multiplier = 0.21

Business Lines included (BCM2 Default)

Cable Fill Factors Derived by ETI (see Appendix 6A)  
with the following exceptions:

Distribution Fill Density Zone 1 = 0.4

Distribution Fill Density Zone 2 = 0.45

| Aggregate Support               | ARMIS       |
|---------------------------------|-------------|
| At \$20 = \$                    | 097,671,830 |
| At \$30 = \$                    | 888,644,474 |
| At \$40 = \$                    | 705,518,333 |
| At \$50 = \$                    | 552,998,852 |
| At \$60 = \$                    | 429,367,001 |
| At \$70 = \$                    | 336,068,544 |
| At \$80 = \$                    | 268,922,050 |
| Annual Benchmark Cost = \$      | 753,808,908 |
| State Average Monthly Cost = \$ | 44.11       |

| Density      | Households | Lines     |
|--------------|------------|-----------|
| Less 5       | 19,098     | 7,809     |
| 5 to 200     | 408,594    | 227,029   |
| 200 to 650   | 266,499    | 221,816   |
| 650 to 850   | 101,986    | 79,455    |
| 850 to 2550  | 681,340    | 502,273   |
| Greater 2550 | 397,991    | 385,660   |
| Total        | 1,875,508  | 1,424,042 |

| ARMIS            |            |
|------------------|------------|
| Cost Category    | Households |
| \$0 <= \$5       | -          |
| \$5 <= \$10      | -          |
| \$10 <= \$15     | 5,566      |
| \$15 <= \$20     | 47,632     |
| \$20 <= \$25     | 76,274     |
| \$25 <= \$30     | 102,505    |
| \$30 <= \$35     | 114,102    |
| \$35 <= \$40     | 134,074    |
| \$40 <= \$45     | 129,870    |
| \$45 <= \$50     | 106,221    |
| \$50 <= \$55     | 129,423    |
| \$55 <= \$60     | 131,766    |
| \$60 <= \$65     | 124,124    |
| \$65 <= \$70     | 117,832    |
| \$70 <= \$75     | 97,232     |
| \$75 <= \$100    | 301,841    |
| \$100 <= \$150   | 130,752    |
| \$150 <= \$200   | 45,605     |
| \$200 <= \$250   | 74,777     |
| \$250 <= \$300   | 5,162      |
| \$300 <= \$500   | 644        |
| \$500 <= \$1000  | 83         |
| \$1000+          | 23         |
| Total Households | 1,875,508  |

| Loop Category    | Households |
|------------------|------------|
| 0 <= 5Kft        | 194,576    |
| 5Kft <= 10Kft    | 473,673    |
| 10Kft <= 15Kft   | 432,323    |
| 15Kft <= 20Kft   | 283,523    |
| 20Kft <= 25Kft   | 171,102    |
| 25Kft <= 30Kft   | 106,537    |
| 30Kft <= 40Kft   | 102,024    |
| 40Kft <= 50Kft   | 51,096     |
| 50Kft <= 60Kft   | 21,986     |
| 60Kft <= 70Kft   | 14,541     |
| 70Kft <= 80Kft   | 10,481     |
| 80Kft <= 90Kft   | 7,398      |
| 90Kft <= 100Kft  | 3,685      |
| 100Kft <= 150Kft | 2,511      |
| 150Kft <= 200Kft | 52         |
| 200Kft+          | -          |

| Loop Information    | Length  |
|---------------------|---------|
| Minimum Loop Length | 756     |
| Maximum Loop Length | 165,901 |
| Average Loop Length | 13,274  |

|                            |    |          |
|----------------------------|----|----------|
| Maximum Monthly Cost       | \$ | 1,407.75 |
| Average Monthly Cost       | \$ | 44.11    |
| Lines Above \$10K Loop Inv |    | 18,760   |

*Appendix 6B: Runs Relative to Economics of Scale*

State: Washington

| Density      | Summary Results                 |  | Weighted  |
|--------------|---------------------------------|--|-----------|
| Less 5       | Sum of # Households             |  | 19,098    |
|              | Sum of # Lines                  |  | 7,809     |
|              | Average of Loop Length          |  | 68,385    |
|              | Average of Loop \$ per Line     |  | \$8,034   |
|              | Average of Total Invstmnt \$/Ln |  | \$9,316   |
|              | Average of Monthly Costl        |  | \$ 192.83 |
| 5 to 200     | Sum of # Households             |  | 408,594   |
|              | Sum of # Lines                  |  | 227,029   |
|              | Average of Loop Length          |  | 27,386    |
|              | Average of Loop \$ per Line     |  | \$3,585   |
|              | Average of Total Invstmnt \$/Ln |  | \$3,884   |
|              | Average of Monthly Costl        |  | \$ 84.74  |
| 200 to 650   | Sum of # Households             |  | 266,499   |
|              | Sum of # Lines                  |  | 221,816   |
|              | Average of Loop Length          |  | 14,297    |
|              | Average of Loop \$ per Line     |  | \$1,363   |
|              | Average of Total Invstmnt \$/Ln |  | \$1,509   |
|              | Average of Monthly Costl        |  | \$ 38.15  |
| 650 to 850   | Sum of # Households             |  | 101,986   |
|              | Sum of # Lines                  |  | 79,455    |
|              | Average of Loop Length          |  | 12,152    |
|              | Average of Loop \$ per Line     |  | \$1,490   |
|              | Average of Total Invstmnt \$/Ln |  | \$1,619   |
|              | Average of Monthly Costl        |  | \$ 40.23  |
| 850 to 2550  | Sum of # Households             |  | 681,340   |
|              | Sum of # Lines                  |  | 502,273   |
|              | Average of Loop Length          |  | 10,748    |
|              | Average of Loop \$ per Line     |  | \$1,338   |
|              | Average of Total Invstmnt \$/Ln |  | \$1,461   |
|              | Average of Monthly Costl        |  | \$ 37.10  |
| Greater 2550 | Sum of # Households             |  | 397,991   |
|              | Sum of # Lines                  |  | 385,660   |
|              | Average of Loop Length          |  | 6,785     |
|              | Average of Loop \$ per Line     |  | \$1,018   |
|              | Average of Total Invstmnt \$/Ln |  | \$1,128   |
|              | Average of Monthly Costl        |  | \$ 30.54  |



# Appendix 6B: Runs Relative to Economics of Scale

## DEFAULT Benchmark Cost Model 2 Results

State: Washington

Date: 8/8/96

Time: 3:12:32 PM

| Aggregate Support              | ARMIS       |
|--------------------------------|-------------|
| At \$20 = \$                   | 279,458,573 |
| At \$30 = \$                   | 131,124,036 |
| At \$40 = \$                   | 76,625,619  |
| At \$50 = \$                   | 48,367,064  |
| At \$60 = \$                   | 31,852,538  |
| At \$70 = \$                   | 22,023,646  |
| At \$80 = \$                   | 15,320,631  |
| Annual Benchmark Cost = \$     | 162,297,018 |
| State Average Monthly Cost= \$ | 29.41       |

| Density      | Households | Lines     |
|--------------|------------|-----------|
| Less 5       | 19,098     | 26,849    |
| 5 to 200     | 408,594    | 634,397   |
| 200 to 650   | 266,499    | 487,515   |
| 650 to 850   | 101,986    | 181,135   |
| 850 to 2550  | 681,340    | 1,181,569 |
| Greater 2550 | 397,991    | 782,457   |
| Total        | 1,875,508  | 3,293,923 |

| Cost Category    | ARMIS Households |
|------------------|------------------|
| \$0<=\$5         | -                |
| \$5<=\$10        | -                |
| \$10<=\$15       | 13,423           |
| \$15<=\$20       | 185,801          |
| \$20<=\$25       | 444,999          |
| \$25<=\$30       | 456,067          |
| \$30<=\$35       | 359,502          |
| \$35<=\$40       | 118,054          |
| \$40<=\$45       | 65,471           |
| \$45<=\$50       | 48,410           |
| \$50<=\$55       | 49,588           |
| \$55<=\$60       | 31,926           |
| \$60<=\$65       | 21,659           |
| \$65<=\$70       | 15,138           |
| \$70<=\$75       | 9,298            |
| \$75<=\$100      | 36,863           |
| \$100<=\$150     | 14,510           |
| \$150<=\$200     | 3,423            |
| \$200<=\$250     | 1,353            |
| \$250<=\$300     | -                |
| \$300<=\$500     | 23               |
| \$500<=\$1000    | -                |
| \$1000+          | -                |
| Total Households | 1,875,508        |

| Loop Category    | Households |
|------------------|------------|
| 0 <= 5Kft        | 194,576    |
| 5Kft <= 10Kft    | 473,673    |
| 10Kft <= 15Kft   | 432,323    |
| 15Kft <= 20Kft   | 283,523    |
| 20Kft <= 25Kft   | 171,102    |
| 25Kft <= 30Kft   | 106,537    |
| 30Kft <= 40Kft   | 102,024    |
| 40Kft <= 50Kft   | 51,096     |
| 50Kft <= 60Kft   | 21,986     |
| 60Kft <= 70Kft   | 14,541     |
| 70Kft <= 80Kft   | 10,481     |
| 80Kft <= 90Kft   | 7,398      |
| 90Kft <= 100Kft  | 3,685      |
| 100Kft <= 150Kft | 2,511      |
| 150Kft <= 200Kft | 52         |
| 200Kft+          | -          |

| Loop Information    | Length  |
|---------------------|---------|
| Minimum Loop Length | 756     |
| Maximum Loop Length | 165,901 |
| Average Loop Length | 15,199  |

|                            |          |
|----------------------------|----------|
| Maximum Monthly Cost       | \$414.28 |
| Average Monthly Cost       | \$29.41  |
| Lines Above \$10K Loop Inv | 1,307    |

*Appendix 6B: Runs Relative to Economics of Scale*

State: Washington

Date: 8/8/96

Time: 3:12:32 PM

| Density      | Summary Results                 | Weighted  |
|--------------|---------------------------------|-----------|
| Less 5       | Sum of # Households             | 19,098    |
|              | Sum of # Lines                  | 26,849    |
|              | Average of Loop Length          | 70.190    |
|              | Average of Loop \$ per Line     | \$4.771   |
|              | Average of Total Invstmnt \$/Ln | \$5.196   |
|              | Average of Monthly Cost l       | \$110.80  |
| 5 to 200     | Sum of # Households             | 408,594   |
|              | Sum of # Lines                  | 634,397   |
|              | Average of Loop Length          | 29.933    |
|              | Average of Loop \$ per Line     | \$1.815   |
|              | Average of Total Invstmnt \$/Ln | \$1.981   |
|              | Average of Monthly Cost l       | \$47.47   |
| 200 to 650   | Sum of # Households             | 266,499   |
|              | Sum of # Lines                  | 487,515   |
|              | Average of Loop Length          | 15.436    |
|              | Average of Loop \$ per Line     | \$813     |
|              | Average of Total Invstmnt \$/Ln | \$931     |
|              | Average of Monthly Cost l       | \$26.86   |
| 650 to 850   | Sum of # Households             | 101,986   |
|              | Sum of # Lines                  | 181,135   |
|              | Average of Loop Length          | 13.082    |
|              | Average of Loop \$ per Line     | \$814     |
|              | Average of Total Invstmnt \$/Ln | \$924     |
|              | Average of Monthly Cost l       | \$26.67   |
| 850 to 2550  | Sum of # Households             | 681,340   |
|              | Sum of # Lines                  | 1,181,569 |
|              | Average of Loop Length          | 11.279    |
|              | Average of Loop \$ per Line     | \$702     |
|              | Average of Total Invstmnt \$/Ln | \$809     |
|              | Average of Monthly Cost l       | \$24.40   |
| Greater 2550 | Sum of # Households             | 397,991   |
|              | Sum of # Lines                  | 782,457   |
|              | Average of Loop Length          | 7.629     |
|              | Average of Loop \$ per Line     | \$574     |
|              | Average of Total Invstmnt \$/Ln | \$676     |
|              | Average of Monthly Cost l       | \$21.73   |

## 7 | BLUEPRINT FOR CORRECTING THE BCM2

### 7.1 The BCM2 takes several steps forward and some different steps backward

The primary focus of this report has been on the BCM2 — specifically, the ways in which it has improved and the ways in which it has regressed. We have provided specific recommendations to regulators throughout the report. The major recommendations regarding the BCM2 are summarized below:<sup>145</sup>

- While regulators may seek some way to “validate” the results of a cost proxy model, such a validation should not be based upon a comparison of the model results with embedded costs. Similarly, there should be no expectation of a correlation between the existing high cost fund and the distribution of high cost support as produced by a cost proxy model. The way to “validate” a model is to examine the robustness of its underlying logic, to obtain up-to-date information for the data inputs, and to subject the model to sensitivity analyses.
- The BCM2 is not an open model that lends itself as a tool for public policy debate. Instead, the Sponsors have attempted to accomplish an end run around some of the very issues about which regulators have sought comment.
- The BCM2 processes data significantly faster than the original BCM, but it is still unwieldy and time-consuming to examine for the entire country.
- Until such time as some portion of the \$8.34 in non-plant-related expenses can be demonstrated to support primary residential service, this entire amount should be subtracted by setting the “other allocation factor” to zero.
- The cost factor that is applied to the investment should be fully supported before it is adopted. The depreciation rates that are used to compute the cost factor should

---

145. Many of the recommendations would apply to any cost proxy model being used in the context of deliberating on universal service funding requirements.

## *Blueprint for Correcting the BCM2*

reflect the fact that the plant necessary to provide residential local exchange service will have longer lives than the plant necessary for other services. Universal service funding should not be used by ILECs as a way to support the early retirement of plant and the corresponding deployment of technology for strategic and competitive purposes.

- The accuracy of the switching module in the BCM2 has been substantially improved and could be improved further if the deployment of remote switching units were done in a forward-looking manner.
- The BCM2 should be opened up to enable users to select the most economic crossover point for deploying fiber rather than copper in the feeder — limiting a user's selection to four fundamentally uneconomic options is unacceptable.
- The BCM2 should be run using the *economic* choice as to the copper-fiber crossover point rather than an *engineering* choice that may relate to services other than basic primary residential local exchange access.
- The excessive structure costs in the BCM2 should be rejected because they reflect a scorched earth approach while the switching costs and other model elements are based upon a scorched node network design philosophy.
- It is appropriate, as the BCM2 has done, to (1) include the costs of the pedestal and network interface device; (2) reflect the impact of slope on network costs; and (3) exclude large portions of uninhabited land in the deployment of a network.
- The economies of scale and scope inherent in ILEC networks should be flowed back to primary line residential service before any subsidy is applied — the BCM2 fails to do this.
- The need for universal service funding should be assessed at the wire center level — the BCM2 does not support this type of analysis.
- When regulators conduct final runs of a cost proxy model, they should make an adjustment for the subscribership rate, i.e., for the fact that universal service goals require the availability of basic local exchange service for *all* households although approximately 5% of households do not subscribe and thus make no payment for basic service.

Most of our recommendations are in line with criticisms that we directed at the original BCM in our April Report. We faulted the BCM for its failure to properly model the cost of providing basic, single line residential local exchange service; and for its failure to attribute

a portion of the economies of scale that result from the single, multipurpose network back to the residential subscribers before assessing support requirements. The BCM2 has fallen short in both respects. BCM2 produces an annual benchmark cost estimate for Washington State that is more than triple the inflated estimate produced by the original BCM.<sup>146</sup> It is not surprising, therefore, that the BCM2 produces higher universal service funding requirements for Washington State as well. Tables 7.1 through 7.3 below distill these glaring shortcomings of the BCM2.

| Table 7.1   |                     |            |                      |            |
|---|---------------------|------------|----------------------|------------|
| Comparison of the Default Level and Targeting of<br>USF Support in the BCM and BCM2 for Washington State at<br>the \$30 Support Threshold |                     |            |                      |            |
| Household<br>Density Zone   | BCM Default Results |            | BCM2 Default Results |            |
|   | Support             | Percentage | Support              | Percentage |
| Less than 5   | \$43,945,043        | 85%        | \$19,429,819         | 15%        |
| 5 to 200  | \$7,621,435         | 15%        | \$99,779,891         | 76%        |
| 200 to 650  | \$0                 | 0%         | \$4,187,327          | 3%         |
| 650 to 850  | \$0                 | 0%         | \$1,172,565          | 1%         |
| 850 to 2550   | \$291               | 0%         | \$4,406,936          | 3%         |
| > 2550  | \$0                 | 0%         | \$2,147,497          | 2%         |
| Total   | \$51,566,769        | 100%       | \$131,124,497        | 100%       |

As seen in Table 7.1, the BCM, using the forward-looking cost factor, did not award any universal service support to the four most densely populated household density zones, aside from an anomalous \$291 awarded in density zone 5. In contrast, the BCM2 awards over \$2-million in universal service support to households in CBGs with greater than 2,550 households per square mile. The households in the next most densely settled CBGs receive over \$4-million of support from the BCM2 with the top four density zones receiving over

---

146. The BCM's annual benchmark cost for Washington State using the forward-looking cost factor is \$396,222,618. The BCM2 annual benchmark cost for Washington State is \$1,162,297,004 using the three default cost factors for the three categories of plant investment and the default values for the non-plant-related expenses.

## *Blueprint for Correcting the BCM2*

\$11-million. In Table 7.2, below, we have extrapolated the BCM2's support estimates by density zone for Washington State to the national level. Accordingly, the BCM2 would award \$148-million in universal service support to CBGs with greater than 2,550 households per square mile. Whereas, under the uncorrected BCM, the four densest zones would receive no support, under the BCM2, these four zones would receive 9% of the total universal service support.

| <p style="text-align: center;">Table 7.2</p> <p style="text-align: center;">Comparison of the Default Level and Targeting of<br/>National USF Support in the BCM and BCM2<br/>at the \$30 Support Threshold<br/>(Extrapolated from Washington State)</p> |                     |            |                      |            |
|--|---------------------|------------|----------------------|------------|
| Household<br>Density Zone  | BCM Default Results |            | BCM2 Default Results |            |
|  | Support             | Percentage | Support              | Percentage |
| Less than 5  | \$1,872,925,624     | 85%        | \$1,113,783,774      | 15%        |
| 5 to 200   | \$330,516,287       | 15%        | \$5,643,171,120      | 76%        |
| 200 to 650   | \$0                 | 0%         | \$222,756,755        | 3%         |
| 650 to 850   | \$0                 | 0%         | \$74,252,252         | 1%         |
| 850 to 2550  | \$0                 | 0%         | \$222,756,755        | 3%         |
| > 2550   | \$0                 | 0%         | \$148,504,503        | 2%         |
| Total  | \$2,203,441,910     | 100%       | \$7,425,225,158      | 100%       |

Clearly, the “enhancements” made by the Sponsors of the BCM2 — notably the inflated cost factor, the increased structure costs, and the deployment of additional distribution plant — have driven up the cost estimates across the board. Table 7.3 presents the BCM and BCM2 results for Washington State on a monthly per-line basis by density zone. Again, these results compare the default BCM using the forward-looking cost factor and the default BCM2 with its default (historical) cost factor. The cost to serve the most urban CBGs has increased from an average monthly cost of \$9.37 in the BCM to \$21.73 in the BCM2. The increase in rural areas is less pronounced, having increased from \$88.46 in the BCM to \$110.80 in the BCM2. Also noteworthy is the difference in the spread between the least dense and most dense areas for the average monthly cost of basic service. The

### *Blueprint for Correcting the BCM2*

ratio of these two numbers is approximately 9 to 1 for the original BCM while the comparable ratio for BCM2 has narrowed to approximately 5 to 1.

*Blueprint for Correcting the BCM2*

**Table 7.3**

**Comparison of BCM and BCM2 Default Results for Washington State**

**BCM**

| Density Zone  | Cost                 | USF Support<br>at \$30 | Lines            | Annual<br>Per Line Cost | Monthly<br>Per Line Cost |
|---------------|----------------------|------------------------|------------------|-------------------------|--------------------------|
| 0 to 5        | \$66,497,243         | \$43,945,043           | 62,645           | \$1,061                 | \$88.46                  |
| 5 to 200      | \$115,143,147        | \$7,621,435            | 372,988          | \$309                   | \$25.73                  |
| 200 to 650    | \$47,148,478         | \$0                    | 273,086          | \$173                   | \$14.39                  |
| 650 to 850    | \$16,094,482         | \$0                    | 109,294          | \$147                   | \$12.27                  |
| 850 to 2550   | \$95,826,900         | \$291                  | 689,169          | \$139                   | \$11.59                  |
| > 2550        | \$41,010,722         | \$0                    | 364,583          | \$112                   | \$9.37                   |
| <b>Totals</b> | <b>\$381,720,972</b> | <b>\$51,566,769</b>    | <b>1,871,765</b> |                         |                          |

**BCM2**

| Density Zone  | Cost                   | USF Support<br>at \$30 | Lines            | Annual<br>Per Line Cost | Monthly<br>Per Line Cost |
|---------------|------------------------|------------------------|------------------|-------------------------|--------------------------|
| 0 to 5        | \$35,697,369           | \$19,429,819           | 26,849           | \$1,330                 | \$110.80                 |
| 5 to 200      | \$361,402,141          | \$99,779,891           | 634,397          | \$570                   | \$47.47                  |
| 200 to 650    | \$157,157,632          | \$4,187,327            | 487,515          | \$322                   | \$26.86                  |
| 650 to 850    | \$57,966,624           | \$1,172,565            | 181,135          | \$320                   | \$26.67                  |
| 850 to 2550   | \$346,033,286          | \$4,406,936            | 1,181,569        | \$293                   | \$24.40                  |
| > 2550        | \$204,039,967          | \$2,147,497            | 782,457          | \$261                   | \$21.73                  |
| <b>Totals</b> | <b>\$1,162,297,018</b> | <b>\$131,124,036</b>   | <b>1,871,765</b> |                         |                          |

**Notes:**

- 1) BCM default results are those using the forward-looking cost factor.
- 2) BCM2 default results use the only cost factor option provided, i.e. (historical).



## **7.2 The CPM should not be adopted for use in universal service proceedings**

While we have not attempted an exhaustive analysis of the CPM in this report, in the process of comparing the three models before the FCC we have identified a number of serious deficiencies in the CPM. Many of the CPM's problems stem directly from its basic design, as the CPM relies on many critical inputs and assumptions that are not explicitly found in the CPM software itself, but instead flow into the CPM's results via the "unitized" cost estimates and related network parameters that are fed into the CPM's data tables. Some of the most significant problems are as follows:

- Unlike the other models, the CPM's loop modelling process does not follow a bottoms-up engineering/planning approach that builds up a simulated network from underlying components as required to meet the total specified demand level. Instead, the CPM estimates the total outside plant investment costs for the network by simply summing together the individual loop investments generated using its unitized data tables.
- Many of the CPM's inputs are unreviewable, company-proprietary data, which seriously limits the ability of regulators to validate the model.
- In the current version of the CPM, many of the data table inputs have been drawn specifically from Pacific Bell company-proprietary databases and therefore strongly reflect the particular characteristics of Pacific Bell's embedded network.
- The CPM relies upon Bellcore's Switching Cost Information System (SCIS), another highly complex and highly proprietary model that Bellcore has consistently declined to make publicly available.

In our view, these problems preclude use of the CPM for the evaluation of universal service funding requirements unless major revisions were undertaken. In California (where the BCM2 was not offered for consideration), the ALJ presiding over the PUC's universal service proceeding concluded that numerous, major corrections had to be made to the CPM to result in a reasonable estimate of universal service costs. These adjustments — including longer depreciation lives, higher fill factors, a longer fiber/copper feeder crossover point, among others — totaled \$1.45-billion in excluded costs, thereby eliminating *eighty-five percent* of the \$1.7-billion statewide subsidy originally claimed by Pacific Bell in that proceeding.<sup>147</sup> Rather than undertake such a major overhaul to rehabilitate the CPM (which would not correct the "closed" nature of the CPM in any case), we continue to

---

147. CPUC Docket R.95-01-020/L.95-01-021, *Proposed Decision of ALJ Wong*, August 5, 1996 at 4.